USGS
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Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

December 2009

The primary metals leading index continued to climb in November, elevating its 6-month smoothed growth rates to ranges not seen since the recovery from the 1981-82 recession. The leading index growth rate indicates that the recovery in primary metals industry activity is likely to continue in the near term. The rising metals price leading index growth rate indicates further metals price growth in the months ahead.

The primary aluminum and the aluminum mill products indexes are suspended because of discontinued availability of industry-specific historical data. The USGS will continue to calculate the steel and copper composite indexes.

The **primary metals leading index** increased 3.7% in November to 139.9 from a revised 134.9 in October. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend increased to 19.7% from a revised 12.0% in October. A growth rate above +1.0% is usually a sign of an upward near-term trend for future metals activity, while a growth rate below -1.0% indicates a downward trend. For an explanation of these indexes and a definition of the primary metals industry, see page 10.

Three of the four available index components increased in November, and one declined. The average workweek in primary metals establishments was more than 1-hour longer in November than in October. It contributed 3.2 percentage points to the net increase in the leading index. The stock price index combining construction and farm machinery companies and industrial machinery companies, which has generally increased from its low point in March, contributed 0.8 percentage points to the leading index in November. Although the increase in the JOC-USGS metals price leading index growth rate only rounded up to 0.1 percentage point in November, it has risen every month since the beginning of the year. In contrast, the Institute for Supply Management's PMI decreased, but remained above the threshold that denotes an increase in future U.S. manufacturing activity. It contributed -0.5 percentage points to the leading index. The primary metals leading index will likely be revised next month when the remaining four components become available.

The high primary metals leading index growth rate is indicating that the recovery in primary metals industry activity is likely to continue. It appears that the economic recovery in the United States has picked up speed, which bodes well for metals demand. Furthermore, global economic conditions, particularly in emerging economies, appear strong enough to support additional metals demand.

The **steel leading index** increased 2.3% in October, the latest month for which it is available, to 103.6 from a revised 101.3 in September. Its 6-month smoothed growth rate moved up to 4.0% from a revised -1.3% in September. A 2-hour longer average workweek in iron and steel mills was the largest contributor to the leading index in October. An increase in car and light truck sales in October made a hefty contribution. The high steel scrap price growth rate also buoyed the leading index. Meanwhile, the shrinking inflation-adjusted M2 money supply growth rate had a strong negative pull on the leading index. The steel leading index growth stepped back into positive territory and has generally increased since last November. It is suggesting that the recovery in U.S. steel industry activity will continue in the near term, but at a somewhat uneven pace.

The **copper leading index** increased 1.6% in October to 115.3 from a revised 113.5 in September. Its 6-month smoothed growth rate increased to 9.9% from a revised 5.5% in September. A jump in overtime hours in copper rolling, drawing, extruding, and alloying plants made the largest positive contribution to the net increase in the leading index. The rising price of copper and a rebound in new orders for nonferrous metal products also boosted the copper leading index in October. The copper leading index growth rate is indicating that the decline in domestic copper activity has ended and the domestic copper industry is poised for a recovery.

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Global Economic Recovery Supports Metals Price Growth

The **metals price leading index** increased 2.0% to 117.5 in October, the latest month for which it is available, from a revised 115.2 in September. Its 6-month smoothed growth rate set a new record high of 31.9% in October, up from a revised 30.8% in

September. The growth rate of the Organization for Economic Cooperation and Development (OECD) Total Leading Index made the largest positive contribution, 1.1 percentage points, to the net increase in the leading index. It is continuing to rise, indicating further increases in economic activity for most major industrialized countries. The high growth rate of the trade-weighted average exchange value of other major currencies against the U.S. dollar contributed 0.5 percentage points to the leading index. The increase in the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products contributed 0.4 percentage points. The small increase in the yield spread between the U.S. 10-year Treasury Note and the federal funds rate rounded to zero. The metals price leading index signals major changes in the growth rate of nonferrous metals prices an average of 8 months in advance.

The growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories, which is an indicator of supply, fell slightly in October. Reduced U.S. metal inventories and the high metals price leading index growth rate indicate further metals price growth.

The business cycle and inventories are only two factors in metal price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, foreign exchange rates, geopolitical instability, and production costs.

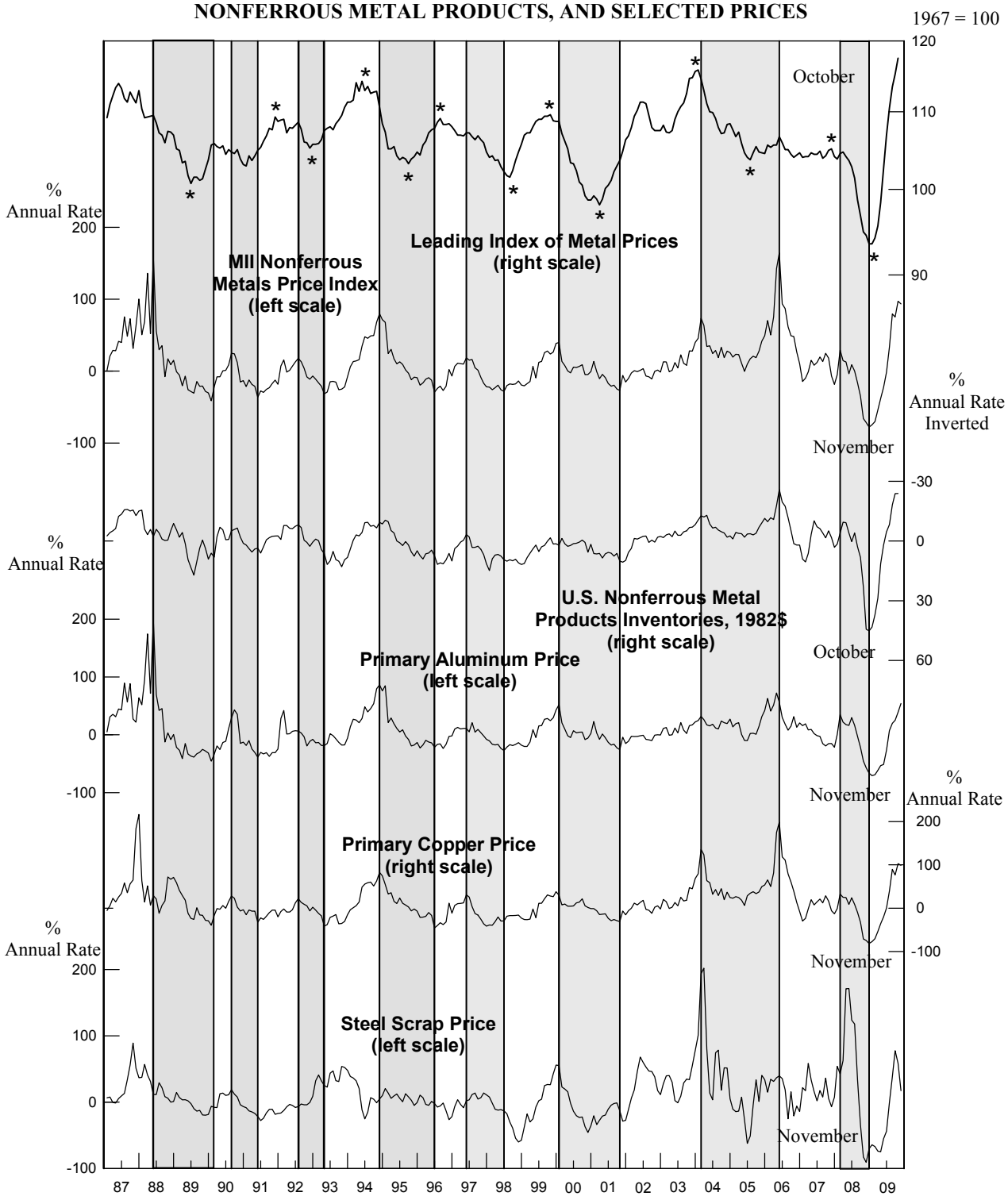
Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
2008						
October	94.9r	-65.9	23.1	-45.4	-70.8	-82.7
November	94.5	-71.4	44.3	-57.2	-74.2	-90.8
December	93.5	-77.9	45.1	-66.5	-81.2	-70.2
2009						
January	93.5r	-74.7	43.2	-70.8	-76.9	-64.3
February	94.2r	-70.2	37.1	-69.3	-70.3	-67.0
March	95.6	-54.1	28.7	-61.6	-53.5	-74.0
April	98.4	-38.1	11.4	-53.4	-35.6	-74.9
May	102.6r	-22.6	2.0	-51.2	-19.8	-55.1
June	106.9	-1.6	-4.6r	-26.9	0.2	-44.0
July	110.5r	33.3	-8.3r	7.2	39.7	-0.7
August	113.4r	79.3	-18.1r	19.8	89.7	38.1
September	115.2r	75.2	-23.8r	25.2	77.0	77.4
October	117.5	97.3	-23.9	38.8	102.8	58.6
November	NA	93.4	NA	54.2	98.9	17.2

NA: Not available **r:** Revised

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metal products, the Organization for Economic Cooperation and Development (OECD) Total Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metal products (NAICS 3313, 3314, & 335929). Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.
Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Organization for Economic Cooperation and Development (OECD); and Federal Reserve Board.

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

U.S. Geological Survey, December 2009

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2008				
December	125.8	-23.3	90.4	-22.4
2009				
January	125.5	-21.8	87.3	-25.5
February	122.9	-22.8	85.0	-26.8
March	120.9	-23.0	82.5	-28.4
April	121.7	-19.5	81.1	-28.0
May	124.1	-13.8	79.8	-27.3r
June	126.3	-8.3	79.4	-25.0r
July	128.3r	-2.9r	82.1r	-16.8r
August	131.6r	4.1r	83.1r	-11.5r
September	133.0r	8.1r	83.6r	-7.2r
October	134.9r	12.0r	84.8	-1.6
November	139.9	19.7	NA	NA

NA: Not available **r:** Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**October**	**November**
1. Average weekly hours, primary metals (NAICS 331)	0.2r	3.2
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	0.3r	0.8
3. Ratio of price to unit labor cost (NAICS 331)	0.7	NA
4. JOC-USGS metals price index growth rate	0.2r	0.1
5. New orders, primary metal products, (NAICS 331 & 335929) 1982$	0.2	NA
6. Index of new private housing units authorized by permit	-0.2	NA
7. Growth rate of U.S. M2 money supply, 2005$	-0.5	NA
8. PMI	0.4r	-0.5
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.3r	3.6

Coincident Index	**September**	**October**
1. Industrial production index, primary metals (NAICS 331)	0.5r	0.7
2. Total employee hours, primary metals (NAICS 331)	0.0r	0.1
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982$	0.0r	0.5
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.6r	1.4

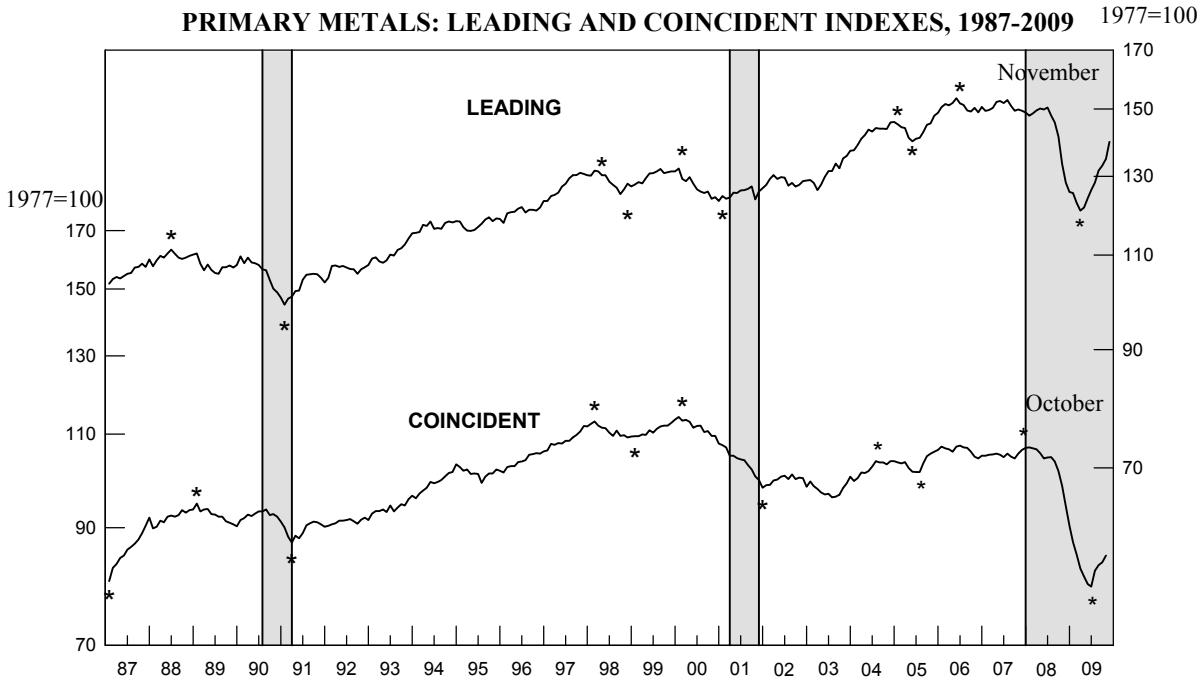
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and U.S. Geological Survey; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available **r:** Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

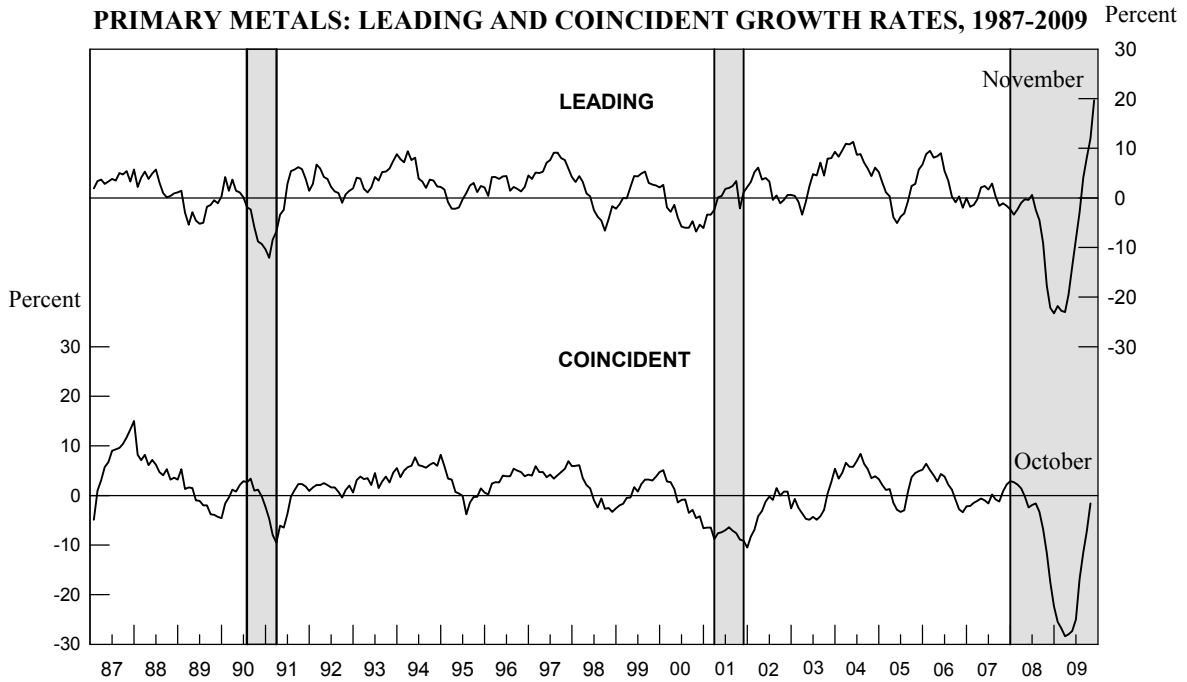
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1987-2009



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1987-2009



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, December 2009

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2008				
November	99.7	-24.3	91.9	-18.0
December	101.4	-19.9	88.1	-22.6
2009				
January	102.0	-17.3	85.5	-25.0
February	100.7	-17.7	84.4	-24.6
March	99.6	-17.4	82.3	-25.8
April	99.3	-15.6	79.8	-27.4
May	101.3	-9.8	79.4	-25.3
June	102.6r	-5.1r	80.4r	-20.6r
July	101.8r	-3.9r	82.3r	-13.9r
August	103.9	2.1	83.6	-8.3
September	101.3r	-1.3r	83.6	-5.4r
October	103.6	4.0	87.0	4.7

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

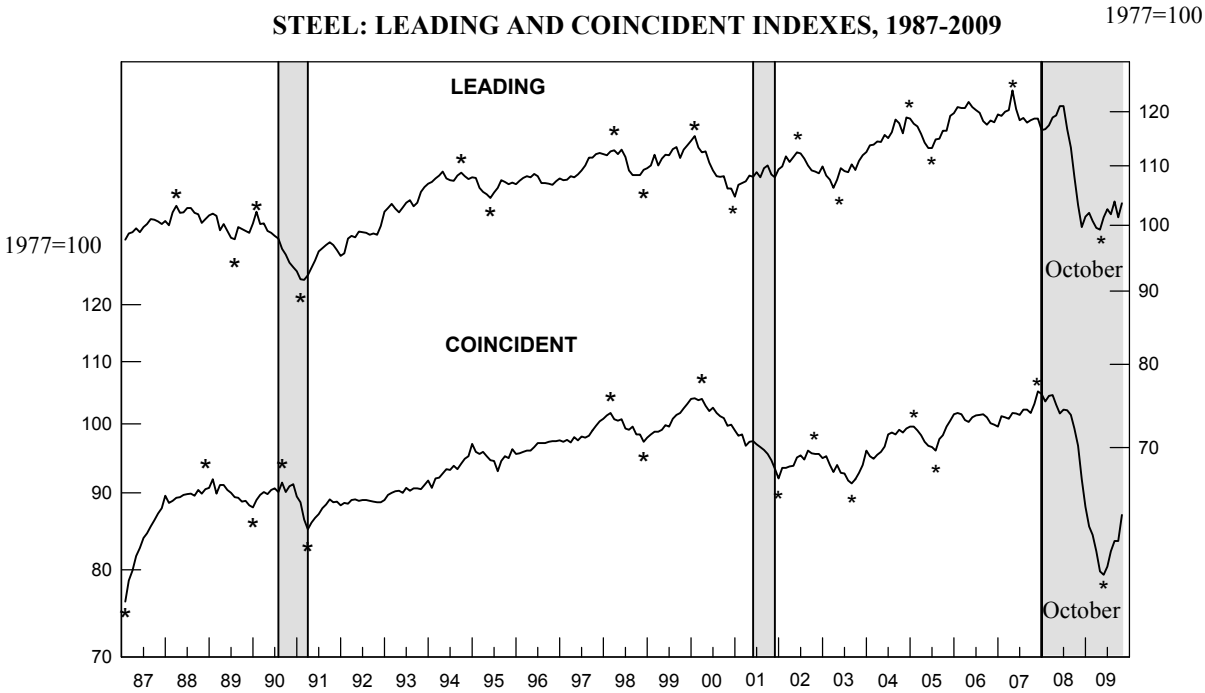
Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**September**	**October**
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	-1.3	1.6
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982$	0.0	0.1
3. Shipments of household appliances, 1982$	-0.2	0.0
4. S&P stock price index, steel companies	0.2	-0.3
5. Retail sales of U.S. passenger cars and light trucks (units)	-1.8	0.7
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.9	0.5
7. Index of new private housing units authorized by permit	0.0	-0.2
8. Growth rate of U.S. M2 money supply, 2005$	-0.4	-0.5
9. PMI	0.0	0.4
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-2.6	2.3
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	0.6r	1.1
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982$	0.4r	0.6
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	-1.1	2.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.0r	4.0

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

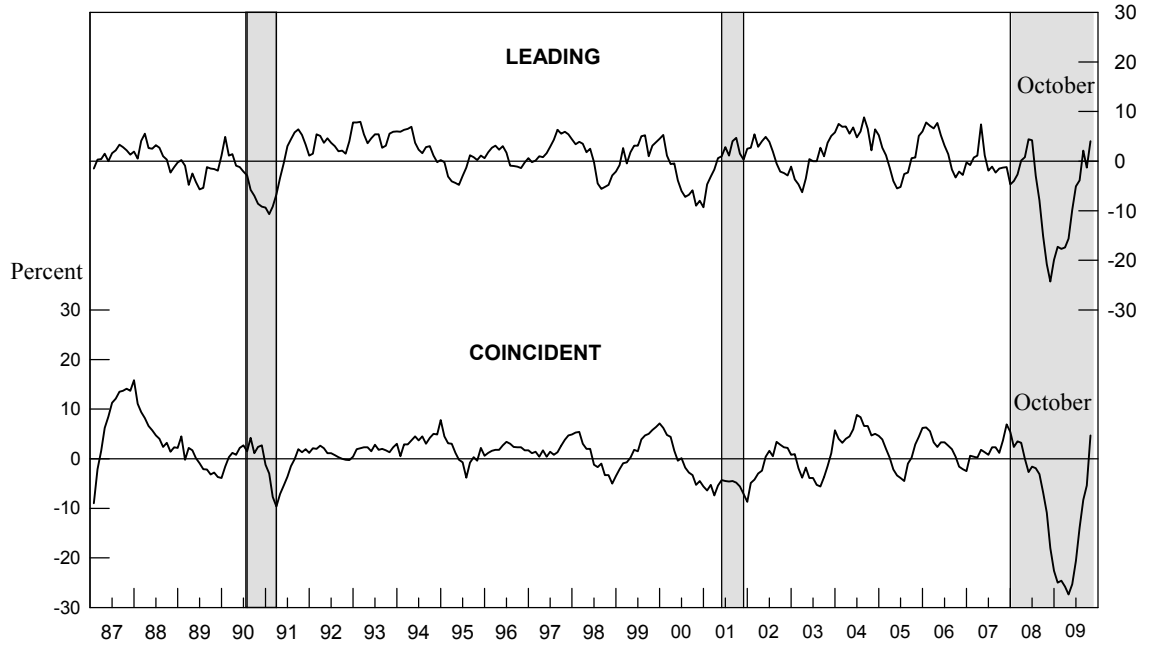
r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1987-2009



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1987-2009



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, December 2009

Table 6.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2008				
November	110.4	-18.4	99.6	-6.3
December	108.5	-19.7	98.4	-8.1
2009				
January	107.2	-19.8	97.9	-8.5
February	103.7	-23.0	94.9	-12.9
March	102.3	-22.7	96.1r	-9.7r
April	105.6	-15.6	94.1	-12.1
May	107.9	-10.1	93.3	-12.2
June	110.4r	-4.0r	94.5	-8.5
July	113.0	2.6	96.0r	-4.3r
August	117.2	11.1	95.4r	-4.2r
September	113.5r	5.5r	94.3r	-5.3
October	115.3	9.9	94.9	-2.7

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

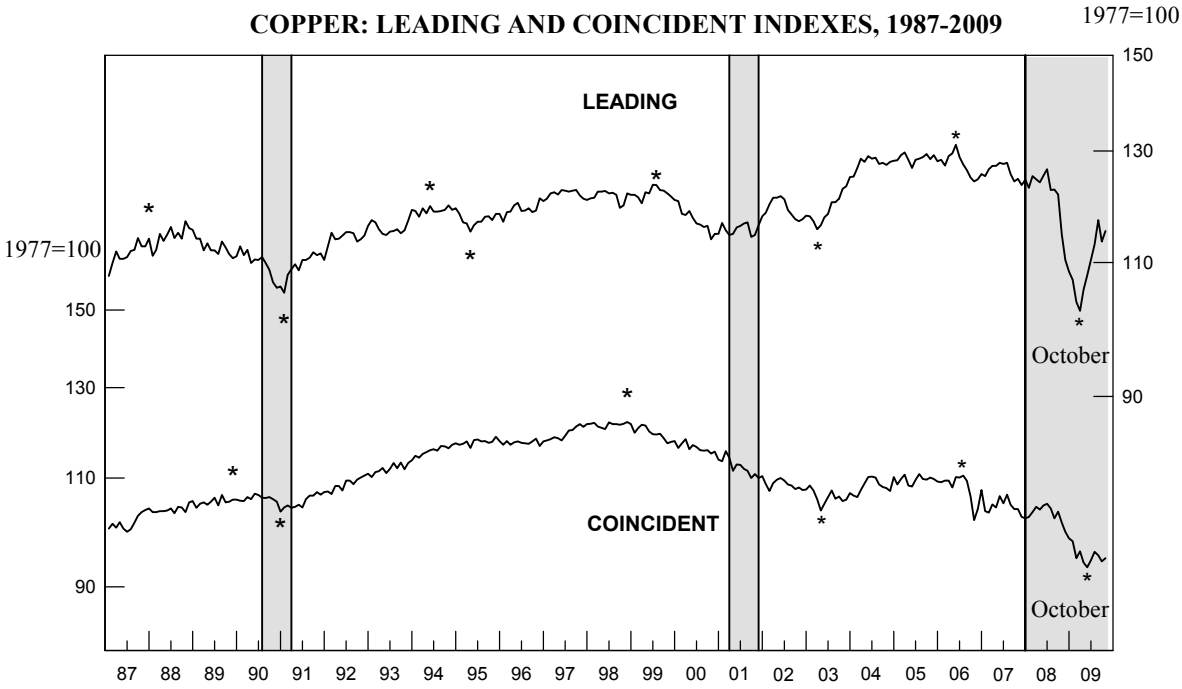
Table 7.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

	September	October
Leading Index		
1. Average weekly overtime hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	-2.1	1.4
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982$	-0.2	0.3
3. S&P stock price index, building products companies	-0.3	-0.4
4. LME spot price of primary copper	-0.3	0.4
5. Index of new private housing units authorized by permit	-0.1r	-0.3
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	-0.2	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-3.2	1.4
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	0.2r	-0.1
2. Total employee hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	-1.4	0.7
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.1r	0.7

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 4, and 6 of the leading index.

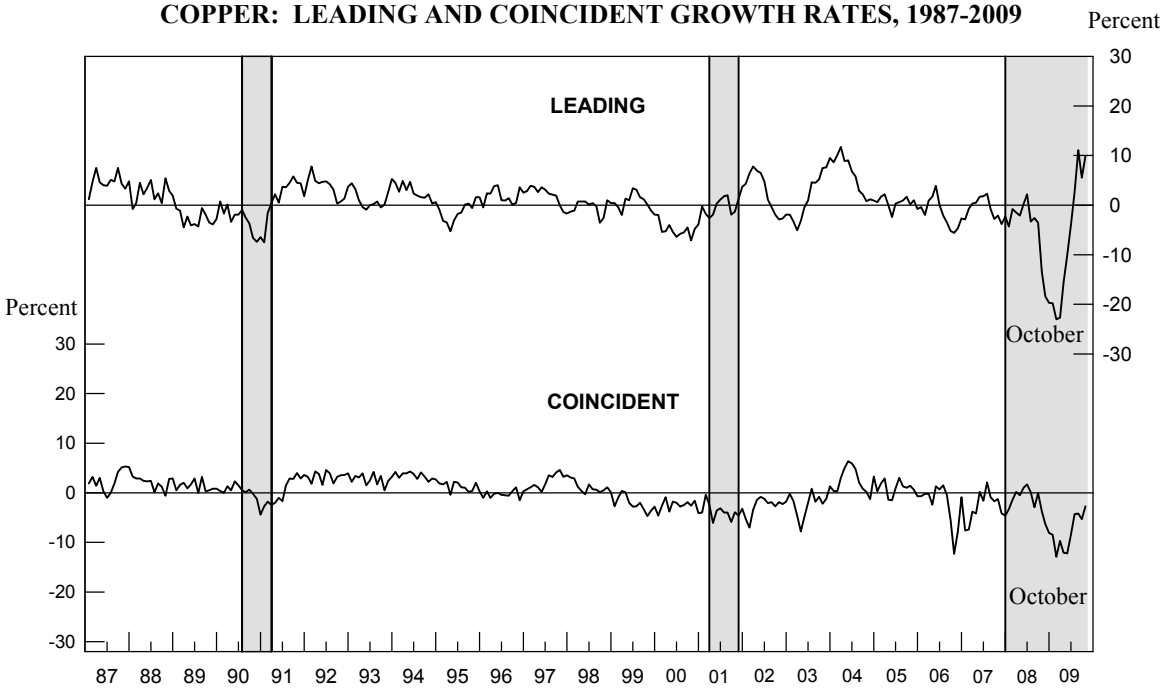
r: Revised NA: Not available

CHART 6.
COPPER: LEADING AND COINCIDENT INDEXES, 1987-2009



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 7.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1987-2009



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, December 2009

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930s. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

The metal industry coincident indexes reflect industry activity classified by the U.S. Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). Of the five metal industries, primary metals (NAICS 331) is the broadest, containing 25 different metal processing industries. Steel, aluminum, and copper are specific industries within the primary metals group.

The SIC was the main vehicle used by the U.S. Government and others in reporting industry economic statistics throughout most of the last century. Starting with the 1997 U.S. Economic Census, the U.S. Government began using the NAICS, which classifies economic data for industries in Canada, Mexico, and the United States. In general, metal industry indexes starting in 1997 begin to reflect the NAICS classification, while indexes for earlier years follow the SIC. Hence, composite indexes from 1997 forward are not entirely consistent with those of earlier years.

The largest change to primary metals because of the NAICS deals with other communication and energy wire manufacturing (NAICS 335929). Under NAICS, this manufacturing has been removed from primary metals and added to electrical equipment, appliance, and component manufacturing. Because monthly shipments and new orders for this wire are not available, the USGS is estimating their values from 1997 onward and adding them to the appropriate metal industry indicators and indexes to maintain consistency.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

There are other small changes to the primary metals industry because of the switch to the NAICS. Coke oven activity not done by steel mills, for example, is removed and alumina refining, a part of industrial inorganic chemical manufacturing under the SIC, is added. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below –1.0% usually means declining growth.

The next update for these indexes is scheduled for release on the World Wide Web at 10:00 a.m. EST, Friday, January 22. The address for *Metal Industry Indicators* on the World Wide Web is: http://minerals.usgs.gov/minerals/pubs/mii/

The ***Metal Industry Indicators*** is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Gail James (703-648-4915; e-mail: gjames@usgs.gov) and Ken Beckman (703-648-4916; e-mail: kbeckman@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990s. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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